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The 1987 4Vn Herring Fishery

by

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Abstract

The majority of catches in the 4Vn (Sydney Bight) herring fishery were made by five purse seiners between Nov. 2 and Dec. 8, 1987. Catch per successful night was high and consistent with anecdotal reports of high herring abundance; however, the total catch of 2372 t was the lowest recorded in 20 years.

Tagging studies have indicated that this fishery involves a mixture of stock fish (including 4WX, 4Vn and 4T) in unknown proportions and, as a result, no analytical assessment could be undertaken.

Résumé

La majorité des prises réalisées dans la pêcherie de harengs de 4Vn (Sydney Bight) a été le fait de 5 senneurs qui ont pratiqué la pêche entre le 2 novembre et le 8 décembre 1987. La prise par nuit a été élevée et constante, des rapports anecdotiques faisant état d'une forte abondance du hareng; toutefois, les prises totales de 2372 t ont été les plus faibles enregistrées en 20 ans.

Des études de marquage ont révélé que cette pêcherie comprenait un mélange de stocks (y compris 4WX, 4Vn et 4T) en proportions inconnues et que, par conséquent, on ne pouvait entreprendre d'évaluation par des méthodes analytiques.

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Introduction

History of the Fishery

The Sydney Bight herring fishery has two major components. A relatively small (<500 t yr^{-1}; Table 1) trap and gillnet fishery has historically taken place inshore, including the Bras d'Or Lakes, during the spring and summer. A large vessel mobile fishery began in 1968. This was dominated by foreign fleets for the first 2 yr but subsequently has been almost exclusively a Canadian purse seine fishery operating during the late autumn and early winter months. Annual landings peaked at 17,547 t in 1972/73 but, with TAC regulation, have been less than 5000 t since 1978 (Table 1).

Stock structure

Previous tagging studies (summarized by Simon and Stobo 1983) indicated that the winter purse seine fishery exploits overwintering herring which are a mixture of Gulf of St. Lawrence (4T), local (4Vn) and Nova Scotia (4WX) stocks. The relative affinity with other stocks was different in fish tagged at different locations within 4Vn. Of those tagged to the north and west of the area (north of Bird Island) a higher proportion was returned from area 4T; of those tagged in the southeast, a higher proportion was returned from area 4WX.

Herring tagged during the spring fishery (April-May; St. Ann's Bay) were returned primarily from 4Vn (including Bras d'Or Lakes) but also from area 4T.

Description of the 1987 Fishery

Management Plan

The 1988 Scotia-Fundy Region Herring Management Plan limited the 4Vn purse seine fishery:

(i) to the period Nov. 7, 1987 - March 1, 1988;

(ii) to a TAC of 4200 t (by "Gulf-based" vessels); and

(iii) to the area north and west of a line drawn from Pt. Aconi in Cape Breton to the 3Pn/4Vn intersection.

Inshore effort was not under TAC management, except that no effort increase was allowed.

Catch and CPUE

Monthly landings by gear type are presented in Table 2.

The purse seine fishery involved five vessels which were active between Nov. 2 and Dec. 8. The total reported catch (2372 t) is the lowest in 20 yr.

A total catch of 103 t was recorded from inshore gear in 1987, slightly lower than that of the previous year and about half of the mean (245 t) since 1973.

Logbook coverage of the purse seine fishery was good. Logs were received from all vessels for all trips, but accounted for only 74% of the total nominal catch. Catch per successful night (94.9 t) was high and is consistent with skippers reports of high abundance of herring in the area.

The spatial pattern of catch (by 10' square) was calculated from logbook information and is shown in Fig. 1. As in recent years (1983-86), catches were concentrated along the north shore of St. Ann's Bay, around Cape Smokey. The Pt. Aconi line of the Management Plan restricts purse seine activity to the northern section of 4Vn, but Stobo and Simon (1982) pointed out that the centre of the fishery had already shifted northward over the historical period of the fishery and before the line was imposed.

The major portion of the purse seine fishery was concentrated within a 3-wk period. Biological sampling was adequate for the generation of an age length key to generate numbers at age. Five detail samples resulted in 269 fish aged and a catch per detail sample ratio of 8.8 (t/detail fish).

Monthly numbers and weight at age are presented in Table 4. Since the fishery now occurs within a single calendar year, there has been no adjustment of assumed birthday (Jan. 1). The 1983 year-class (age 4) dominated again in number and in 1987 also in weight. The historical catch at age matrix is given in Table 5, and mean weights at age weighted by numbers caught in Table 6.

No sampling of inshore gear was undertaken.

Management Considerations

The prevailing view has been that the summer fixed gear fishery exploits local stocks but that the winter purse seine fishery involves fish from neighboring assessment units. Previous tagging results demonstrated a difference in the affinity for overwintering herring within 4Vn. Those tagged to the north and west of the area (north of Bird Island) showed a higher affinity with 4T, while those tagged in the south and east had a higher affinity with Chedabucto Bay (4WX). The management measure restricting the winter fishery to the northern portion of 4Vn should have reduced the involvement of 4WX fish. Previous CAFSAC advice has emphasized that it would be preferable that there be no fishery on the overwintering mixture of fish in 4Vn.

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Table 1. Historical annual (Oct.-Oct.) herring landings (t) in area 4Vn by major gear segment. All values prior to 1987 are as in Stephenson and Power (1987). New data from DFO, Scotia-Fundy Region, Statistics Branch.

Year	Cdn[a] "fixed gear"	Cdn[b] "mobile gear"	Foreign "mobile gear"	Total "mobile gear"	TAC
62-63	492	-	-	-	
63-64	407	-	-	-	
64-65	252	-	18	18	
65-66	91	-	-	-	
66-67	296	-	17	17	
67-68	235	2	-	2	
68-69	225	2044	11465	13509	
69-70	74	5335	11050	16385	
70-71	142	2917	344	3261	
71-72	162	10681	1	10682	
72-73	116	17537	10	17547	
73-74	212	16285	578	16863	
74-75	226	14297	270	14567	
75-76	74	5546	188	5734	
76-77	120	12831	-	12831	
77-78	310	7078	-	7078	11000
78-79	327	3332	-	3332	8000
79-80	261	2865	-	2865	3000
80-81	328	3952	-	3952	4500
81-82	248	3552	-	3552	3000
82-83	342	3648	-	3648	3000
83-84	483	3980	-	3980	5000
84-85		3925	-	3925	3500
85[c]	200	3470	-	3470	3500[d]
86[c]	123	4352	-	4352	4200[e]
87[c]	103	2372	-	2372	4200

[a]Includes trap, gillnet and misc. gear types.
[b]Purse seine only.
[c]Calendar year.
[d]TAC for period Nov. 7, 1985-Mar. 1, 1986.
[e]TAC for period Nov. 7, 1986-Mar. 1, 1987.

Table 2. Monthly distribution of herring catch (t) by gear type in area 4Vn (source DFO, Scotia-Fundy Region, Statistics Branch).

	1986			1987											
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
4Vn purse seine	-	2547	1805	-	-	-	-	-	-	-	-	-	-	1873	499
4Vn trap/misc.	-	-	-	-	-	-	-	8	1	3	-	-	-	1	-
4Vn gillnet	1	-	-	-	-	-	23	63	3	-	1	-	-	-	-

Table 3. CPUE indices for the 4Vn herring purse seine fishery. Values for 1971-87 are as in previous assessments (Simon and Campana 1984; Stephenson and Power 1985, 1986, 1987).

Year	Catch (t) per successful night	Catch (t) per set
71-72	115.0	-
72-73	90.8	45.4
73-74	82.0	43.2
74-75	85.8	37.8
75-76	52.4	33.5
76-77	78.1	37.7
77-78	70.4	35.0
78-79	23.6	12.8
79-80	77.5	33.7
80-81	45.6	20.6
81-82	31.3	17.4
82-83	58.6	22.5
83-84	73.1	46.3
84-85	45.9	36.9
85-86	108.4	53.0
86-87	106.8	70.1
87-88	94.9	43.8

Table 4. 4Vn herring numbers at age (thousands) and weight at age (g) for the 1987 purse seine fishery.

Age	1	2	3	4	5	6	7	8	9	10	11+	Total
Nov./Dec.												
Number	125	887	2253	4470	1473	786	1196	769	188	114	63	12324
Avg. wt.	55	82	144	183	210	246	252	296	310	316	382	
Catch wt.	7	73	324	819	309	193	302	227	58	36	24	2372
% numbers (85)	-	6.8	6.6	10.1	24.3	27.5	13.7	8.0	1.7	0.4	0.9	
(86)	-	5.6	30.3	25.4	8.3	14.4	8.7	4.6	1.8	0.3	0.2	
(87)	1.0	7.2	18.3	36.3	12.0	6.4	9.7	6.2	1.5	0.9	0.5	
% weight (85)	-	2.6	4.3	7.9	24.3	29.3	16.9	10.2	2.3	0.6	1.7	
(86)	-	2.7	23.1	23.7	8.8	17.6	12.3	7.1	3.0	0.4	1.4	
(87)	0.3	3.1	13.7	34.5	13.0	8.1	12.7	9.6	2.5	1.5	1.0	

Table 5. 4Vn purse seine herring catch-at-age matrix (thousands).

Age[a]	73-74	74-75	75-76	76-77	77-78	78-79	79-80	80-81	81-82	82-83	83-84	84-85	85-86	86-87	87-88
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125
2	43	116	1	0	0	0	0	43	104	82	189	901	1019	1251	887
3	3798	5116	671	16	7	26	3172	518	945	2308	2263	1158	998	6801	2253
4	43737	4156	1544	2986	110	441	3427	3791	1965	2733	5684	5859	1515	5696	4470
5	14264	33189	1848	5103	2377	1413	1671	3946	7192	3359	5078	3069	3657	1863	1473
6	4435	6430	7846	4136	2800	1443	741	1060	2982	5722	3238	3223	4137	3225	786
7	2955	2417	2571	17602	1442	878	1004	645	844	1798	1559	2228	2068	1962	1196
8	3176	2304	1123	8379	7622	847	607	614	-	816	649	639	1210	1023	769
9	2841	2242	892	3401	4056	1701	873	717	77	37	287	98	251	401	188
10	3842	2842	1006	2431	1202	1838	879	1192	77	15	22	128	54	60	114
11+	4969	5401	3461	5451	3098	1915	750	2688	893	150	86	13	142	163	63
Total nos.	84060	64213	20963	49505	22714	10502	13124	15214	15079	17020	19055	17316	15051	22445	12324
Total wt.	16863	14354	5734	12831	7078	3332	2865	3952	3552	3648	4029	3926	3470	4350	2372

[a]Results prior to 1983/84 are presumed to be based upon Nov. 1 birthday. Since 1984, Jan. 1 birthday has been assumed.

Table 6. 4Vn purse seine herring weight-at-age (g).

Age[a]	73-74	74-75	75-76	76-77	77-78	78-79	79-80	80-81	81-82	82-83	83-84	84-85	85-86	86-87	87-88
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55
2	34	52	41	-	-	-	-	36	16	-	108	98	89	93	82
3	85	102	93	105	110	120	103	104	113	107	153	148	149	148	144
4	162	145	157	141	175	189	152	146	182	167	180	201	182	181	183
5	182	203	203	187	220	211	207	201	217	207	217	234	230	205	210
6	218	235	249	219	245	258	255	252	264	247	247	263	245	237	246
7	251	256	273	256	272	289	289	267	310	280	267	289	283	273	252
8	302	287	292	275	308	302	324	332	-	307	287	307	292	301	296
9	325	314	332	295	346	338	366	361	375	362	336	303	321	326	310
10	350	334	361	319	377	376	400	395	375	391	342	378	377	320	316

[a]Results prior to 1983/84 are presumed to be based upon Nov. 1 birthday. Since 1984, Jan. 1 birthday has been assumed.

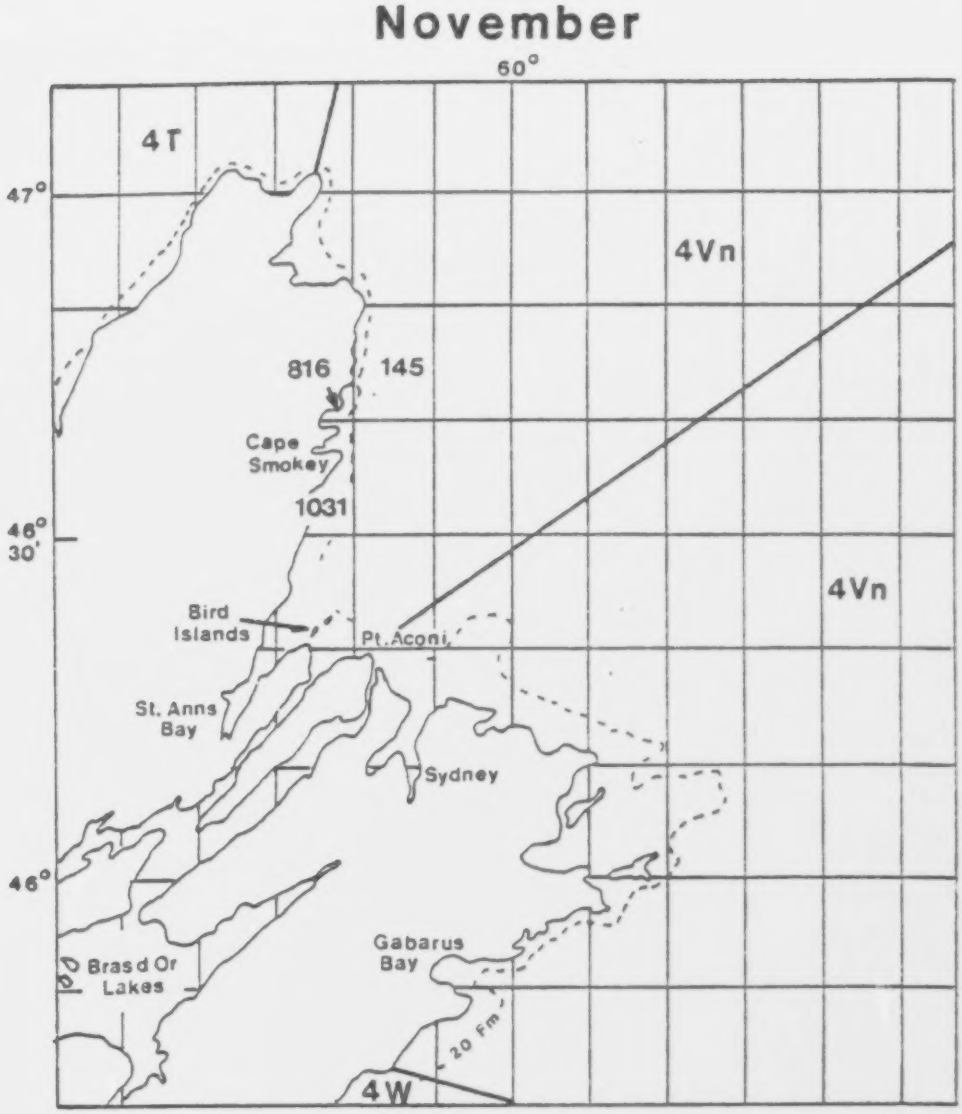

Fig. 1a. 4Vn herring purse seine catch (t) by 10' square in Nov. 1987 (from logbooks weighted by nominal landings).

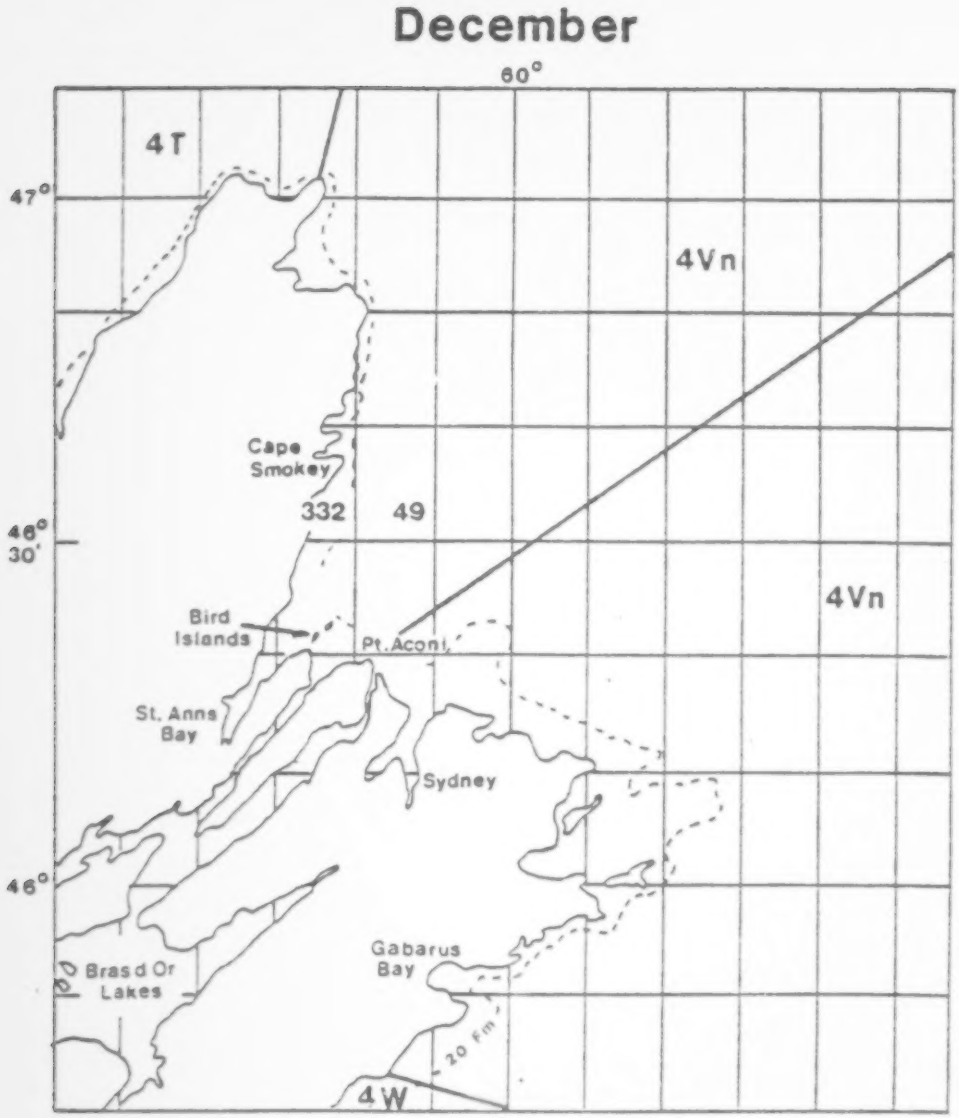

Fig. 1b. 4Vn herring purse seine catch (t) by 10' square in Dec. 1987 (weighted by landings).